

REMARKS

Reconsideration of the instant application is respectfully requested. The present submission is responsive to the Final Office Action of August 22, 2007, in which claims 1-19 are presently pending. A courtesy copy of the claims in their present form is included above. Of those, claims 1 and 2 have now been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,542,559 to Kawakami, et al., in view of U.S. Patent 6,974,709 to Breitschwerdt, et al. Claims 3 and 4 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kawakami, in view of Breitschwerdt, and further in view of U.S. Patent 5,665,166 to Deguchi, et al. Claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kawakami, in view of Breitschwerdt and Deguchi, and further in view of U.S. Patent 7,033,443 to Kellerman, et al. (Kellerman '443)

In addition, Claims 6 and 7 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Kawakami, in view of Breitschwerdt, and further in view of Kellerman '443. Claims 8-10 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Kawakami, in view of Breitschwerdt, and further in view of Kellerman '443 and Deguchi. Claims 11-13 and 19 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Kawakami, in view of Breitschwerdt and Kellerman '443 and further in view of U.S. Patent Publication 2004/0083975 by Tong, et al. Further, claims 14-17 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Kellerman '443, in view of Breitschwerdt, and further in view of Kawakami. Finally, claim 18 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kellerman, in view of Breitschwerdt and Kawakami, and further view of U.S. Patent 6,500,686 to Katata, et al. For the following reasons, however, it is respectfully submitted that the application is now in condition for allowance.

In the present Final Office Action, the Examiner cites column 5, lines 10-30 of the Breitschwerdt reference as teaching the use of a vacuum step both before and after processing of a silicon wafer. The Applicants specifically direct the Examiner's attention to the following sentences in lines 20-30 of the cited portion of Breitschwerdt, with emphasis added:

"Finally, etching device 5 has *turbo pump 60* connected to a shutoff valve 50, which is used to achieve the best possible ending vacuum before and after the processing of silicon wafer 25, particularly a vacuum better than 10⁻⁴ Pa. This is important since, on the one hand, a residual moisture in etching device 5 or on silicon wafer 25 would make the gas phase etching being carried out susceptible to interference, and on the other hand, because remnants of the process gas must be absolutely avoided before unloading silicon wafer 25 from etching device 5."

Thus, Breitschwerdt teaches the evacuation of the process chamber itself by vacuum pressure before and after a semiconductor processing step, such as etching. This is confirmed by a review of Figure 1 of Breitschwerdt, in which the turbo pump 60 is coupled (through valve 50) directly to the vacuum chamber 10 itself. However, there is no teaching or suggestion in Breitschwerdt of coupling a vacuum source to gas supply line 43 so as to apply vacuum pressure to the electrostatic chuck 41 and hence to the wafer.

Based on the teachings of Breitschwerdt, the Examiner then argues that it would be obvious for one skilled in the art to apply the before/after vacuum application to the device of Kawakami to arrive at the claimed invention. Applicants respectfully traverse this conclusion for the reason that, even if one skilled in the art were motivated to combine the teachings of Breitschwerdt and Kawakami, the result would not be application of backside gas evacuation before and after wafer processing, but rather the application of a chamber vacuum before and after wafer processing.

The Examiner's stated motivation on page 3 of the Final Office Action for combining the teachings of Breitschwerdt and Kawakami is the avoidance of remnants of gases and air (which Applicants note is the same motivation as stated in Breitschwerdt). In order to accomplish this objective, the gasses/air present in the process tool chamber itself must be removed. As will be seen from a review of Figure 1 of Kawakami, vacuum pump 24 (via exhaust conduit 20) is the mechanism that is used to evacuate gases from the chamber 2. On the other hand, exhaust pump 57 is used to evacuate backside gas applied to the wafer during processing


Therefore, a proper application of the Breitschwerdt teachings to the Kawakami device by one skilled in the art would result in activating vacuum pump 24 of Kawakami before and after the processing step, and not activating backside exhaust pump 57 of Kawakami prior to device processing. This is because the backside exhaust pump 57 does not evacuate the chamber itself; rather, backside exhaust pump 57 evacuates just the backside gas 56 applied to the backside of the wafer on the chuck. Moreover, since the backside gas 56 is used as a temperature control means of the wafer during plasma processing, there would be no need to operate the backside exhaust pump 57 prior to wafer processing in the first place, as the backside gas 56 would not even be introduced in the supply conduit at that point.

Because neither the combination of Breitschwerdt and Kawakami nor the other references of record teach or suggest that the vacuum assisted chucking is implemented prior to the wafer processing operation for which the wafer is chucked, it is respectfully submitted that each of the outstanding §103 rejections have now been overcome.

For the above stated reasons, it is respectfully submitted that the present application is now in condition for allowance. No new matter has been entered and no additional fees are believed to be required. However, if any fees are due with respect to this Amendment, please charge them to Deposit Account No. 09-0458 maintained by Applicants' attorneys.

Respectfully submitted,
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